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CLINICAL REPORT

Acute hematogenous osteomyelitis of the scapula in children

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Accepted: 31 August 2009

KEYWORDS

Osteomyelitis;
Scapula;
Subperiosteal
abscess;
Children

Summary

Purpose of the study: Osteomyelitis of the scapula is uncommon, often with a misleading clinical presentation. We report four cases of osteomyelitis of the scapula to illustrate the particular clinical imaging findings and treatment related to this location.

Case reports: Between 1996 and 2006, four children were treated for osteomyelitis of the scapula, three boys and one girl, with a mean age of 8 years (range, 5–11 years). The time from symptom onset to hospitalization was 2 days. Pain was noted for all patients and total functional incapacity of the upper extremity was noted for three patients. The diagnosis of osteomyelitis of the scapula was established on the basis of imaging (ultrasound and CT scan). All patients were given medical treatment and underwent surgery. A positive bacteriology was noted in all patients. The bacterium isolated from blood cultures (two cases) and local samples obtained at the surgical site (four cases) were *Meti-S Staphylococcus aureus*.

Results: The results were analyzed by studying the anatomic and functional outcome at a mean follow-up of 36 months (range, 16–60 months). The patients were pain-free and had full range of motion in their shoulders. There were no complications.

Discussion: Few reports are available in the literature on osteomyelitis of the scapula. We discuss the specific clinical and imaging features as well as the treatment for this location.

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Introduction

Acute osteomyelitis (AOM) of the scapula is exceptional, effecting boys more than girls. The symptoms are often misleading. The main differential diagnosis is septic osteoarthritis of the glenohumeral joint.

Staphylococcus aureus was the pathogenic agent most often involved in these cases.

Bone scintigraphy and MRI are important examinations for early diagnosis.

Medical treatment is mandatory and surgery is required when subperiosteal abscess is present.

Case reports

This retrospective study conducted over a 10-year period (June 1996 to May 2006) investigated four children with

DOI of original article: [10.1016/j.rcot.2009.10.009](https://doi.org/10.1016/j.rcot.2009.10.009).

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Table 1 The different clinical and paraclinical data of the four observations.

	Age (years)	Sex	Side	Time to diagnosis (hours)	Clinical symptoms	X-ray	US (subperiosteal abscess)	CT (collection)	Follow-up (months)
Case no. 1	9	F	Right	24	Pain	Normal	No	Outside scapula	16
Case no. 2	7	M	Right	48	Pain + tumefaction	Normal	Yes	Outside scapula	40
Case no. 3	11	M	Left	72	Pain + tumefaction + spinal cord syndrome	Normal	Yes	Outside + inside scapula	28
Case no. 4	5	M	Left	48	Pain + tumefaction	Normal	Yes	Outside scapula	60

US: Ultra Sound.

osteomyelitis of the scapula (Table 1): one girl and three boys with a mean age of 8 years (range, 5–11 years). The right side was affected in two cases.

All children had a low socioeconomic level and lived in poor hygienic conditions.

In one case, an injury in the scapular region was reported.

The time from symptom onset to hospitalization varied from 24 to 72 h (mean, 48 h).

The diagnosis of osteoarthritis of the shoulder was suspected in three cases given the presence of pain in this region in a context of fever with a loss of joint range of movement. In one case, the pain was projected to the spinal column with a dorsolumbar scoliotic posture (Fig. 1). The presence of tumefaction in the posterior region of the shoulder in three cases with exquisite pain in areas of the scapular body challenged the suspected diagnosis.

The functional incapacity of the upper limb was total in three cases and partial in one case. Fever was a mean 39.3°C. A cutaneous entrance point (furuncle) was found in two cases. Biological tests showed an inflammatory syndrome in all cases. One case of hyperleukocytosis was noted, with over 10,000/ml. The sedimentation rate was a mean 56 mm at the first hour (range, 37–150 mm). The C-reactive protein (CRP) values were high in all four cases (mean,

54 mg/l; range, 10–143 mg/l). The plain AP and lateral X-ray views of the shoulder were normal. Ultrasound showed periosteal detachment outside of the scapula (Fig. 2) in three cases (associated with minimal joint effusion in two cases). Isolated thickening of the soft tissues was observed in one case (case no. 1).

CT with contrast injection showed the presence of an isolated subperiosteal abscess developing outside the scapula in three cases and associated with invasion within the scapula (Fig. 3) in one case (case no. 3).

First-line parenteral antibiotics were given associating oxacillin (200 mg/kg/day) with gentamicin (3–5 mg/kg/day).

Given the presence of a subperiosteal abscess, surgery was performed through a posterior arciform approach centered on the scapula.

The infraspinatus muscle was swollen and domed (Fig. 4), with pus rising under the detachment. The scapula body was systematically trephined to drain a collection within the scapula in one patient (case no. 3). No joint invasion was observed.

The bacteria sample taken was positive in all cases. The same bacterium was isolated in the hemocultures in two cases: methicillin-sensitive *S. aureus*.

The parenteral antibiotics were maintained for a mean 21 days, then changed to oral antibiotics until the sedimentation rate normalized (mean, 60 days).

A Dujarrier shoulder guard was worn a mean 21 days.



Figure 1 Substantial tumefaction of the left shoulder with scoliotic posture (case no. 3).

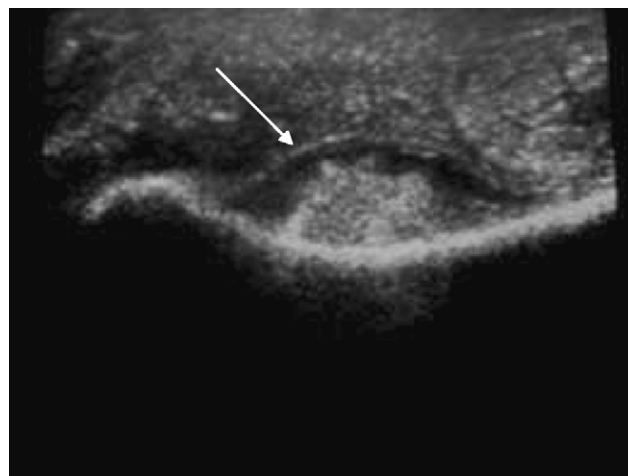


Figure 2 Ultrasound demonstrating a subperiosteal scapular abscess (arrow showing the detached periosteum).



Figure 3 CT demonstrating a collection developing outside (dotted arrow) and inside the scapula (solid arrow).



Figure 4 Posterior approach to the shoulder showing the swollen and domed infraspinatus muscle.

Results

At a mean follow-up of 36 months (range, 16–60 months), the functional result was satisfactory: complete shoulder mobility and disappearance of pain. From an anatomical point of view, no anomalies were observed.

Discussion

AOM is defined as an acute infection of the bone by a pathogenic bacterium, most often *S. aureus*, occurring for the most part in children [1]. The metaphysis of the long bones is the most frequent location of hematogenous AOM in children. Involvement of the short and flat bones is rare [1,2]. Scapula involvement is usually in the body of the scapula and is exceptional. A few rare cases have been described in the literature [3–5].

In our series, only four scapular locations were found, for a rate of 2.6% of all the cases of osteomyelitis treated over the same period. In the series reported by Martini et al. [2], only two similar locations were reported (0.5%) out of 420 cases of osteomyelitis.

AOM occurs more frequently in boys often living in underprivileged areas with poor hygiene, promoting entry points for infection.

The clinical picture of AOM of the scapula presents certain features and varies with the progressive stages of the disease.

At onset, the symptoms are vague, comprising of unspecific clinical signs, sometimes misleading and possibly confused with osteoarthritis of the shoulder (poorly localized pain, painful mobilization of the shoulder explained by reactive joint effusion). This inconclusive picture was responsible for the delay in diagnosis and management, lasting less than 12 h.

At a more advanced stage or at the disease stage, the extension of pus outside the scapula is rapid. This scapular periosteum explains the rapidity of the dissemination of the pus to the soft tissues contained under the infraspinatus muscle. The clinical manifestation is tumefaction of the posterior area of the scapula, indicating the location of the osteomyelitis and associating fever and pain upon mobilization of the scapula. At this stage, functional incapacity is total.

At end-stage disease, the spread of pus into the scapula and the surrounding soft tissues causes frank spinal column disease (scoliotic posture) in association with severe tumefaction of the scapular region and alteration of the patient's general condition.

Laboratory tests show an infectious process with disturbed inflammation markers.

The plain radiographs are negative at the beginning with absence of bone lesions. The radiological anomalies are often delayed for approximately 20 days after the beginning of the infection. Taken at a late stage, the X-ray can show sclerogeodesic images, even glenohumeral joint involvement, arguing in favor of the chronic nature of osteomyelitis [6].

Early diagnosis seems more difficult to establish and it is frequently made with a certain delay, which can be explained by the rarity of this location, the rapid progression of this osteomyelitis (the thinness of the periosteum of the scapula body), and atypical symptoms that can be misleading.

When suspecting this location, early diagnosis can be made based on technetium scintigraphy or MRI showing modification of the scapula body signal. MRI's sensitivity (after fat saturation and gadolinium injection) is 88% and its specificity is 93% [7–10].

Treatment should adhere to the general principles of AOM management, i.e., early double synergic antibiotic therapy given parenterally and rest for the infectious area.

Surgical treatment is proposed when there is purulent collection. The posterior surgical approach only allows exploration of the exterior surface of the scapula. We recommend trephination so as to drain any collections within the scapula.

Conclusion

The scapular location of AOM is rarely described; however, this disease should be suggested with any shoulder pain accompanied by fever. The severity of the clinical picture

varies with the progressive stage of the infection and its invasion within the scapula. MRI contributes greatly to the early diagnosis of this disease.

At the infectious collection stage, surgical treatment including drainage and systematic trephination of the scapular body is the choice treatment.

Conflicts of interest

None.

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